CHP TECHNOLOGY APPLIED TO LEACHATE MANAGEMENT
Outline

• The Technology
• Advantages
• Operating Characteristics
The Technology

Driving Forces

• Leachate costs on the rise because of trucking
• POTW costs on rise as city's balance budgets
• Some states requiring on site treatment
• Renewable energy projects using site gas make a direct LFG leachate project unlikely
• Limited site foot print
• Changing discharge standards
The Technology

- Continuous Evaporative Process
- Operates on Waste Heat
- Direct Heat Exchange - No Heat Exchangers
- Operates at Mild Temperatures & Slight Vacuum
- Reduces Typical Leachate Volume by 95+%
The Technology

Combined Heat and Power

LM-HT® Leachate Concentrators *seamlessly* convert new or existing LFG power plants into CHP power projects.
The Technology

Distilling A Challenge to Simple Elements

Key Design Elements

- Highly Insensitive to Feed Characteristics
- High Levels of Volume Reduction
- Minimal Analytical Support Required
- Can Recover Clean Water for Reuse
- Compatible With Zero Liquid Discharge
Advantages

CFR Title 5 Subtitle D
Energy Independence and Security Act

Section 373

- Defines the requirements
- $10.00 for each 3,412,000 Btu used
- $10,000,000 each year in funding
- Requires 50% use of waste heat at source
- Must be used for different use
Advantages

Given the Energy Independence and Security Act is not funded – here are a couple methods to make CHP work to maximize energy conservation even if it is never funded:

Use jacket water heat with heat exchanger loop to heat onsite buildings like shop and office

• Use exhaust stack heat to treat leachate
Advantages

Enhancing The Value of LFG

A case study from a landfill I ran for 20 years:

At 1,133 scfm of LFG there was 49.63 MM scf/month
OR
The equivalent of 24,800 MM Btu/month
WHILE
A 4-engine power plant rejected the equivalent of 6,950 MM Btu/month in stack gas to atmosphere
WHICH
If put to use in an LM-HT® Concentrator could treat more than 500,000 gallons per month of leachate
Advantages

Landfill Friendly Aspects

• Flexible use of waste heat as a fuel source
• Equipment paid for with capital not expense
• Small foot print
• Easy to install
• Eliminates trucking cost
• Zero liquid discharge
Operating Characteristics

Layout 3.2MW Landfill Gas Power Plant
Operating Characteristics

Energy Estimator

- Cat 3516 exhaust heat to process 4,200 gpd
- Cat 3520 exhaust heat to process 8,400 gpd
- Other 1 mega watt = 5,000 gpd
- Turbine = 10K gpd per mega watt
- 125 scfm natural gas = 10,000 gallon per day
- 250 scfm landfill gas = 10,000 gallon per day
Operating Characteristics

Cost Saving Features

• On site leachate treatment
• Waste heat from LFG to electric plants as fuel
• Eliminates hauling cost
• No off site costs
• One part-time Operator
• Solids put back in landfill
• Manages RO reject liquids
Thank You!

“Your Interest in Our Technology and Services Is Greatly Appreciated”

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LM-HT® Concentrator in Flex-Energy Configuration
Shown Connected to Flare

Automated Flare Cap
Clean Combustion Gas And Evaporated Water Vapor Exhaust
High Turbulence Collection Sump

Limit of Hot Gas Zone - Typically 600° to 1500°F
Extent of Direct Contact Heat Exchange and Evaporation Zone
Start of Cooled Gas Zone - Typically 160° to 190°F

1 LM-HT™ Concentrators, Automated Flare Caps and Waste Heat Transfer Systems are manufactured under one or more U.S. and foreign patents and/or pending patents owned by Heartland Technology Partners, LLC
2 LM-HT & Flex-Energy are trademarks and service marks of Heartland Technology Partners, LLC
LM-HT® Concentrator\(^1\) in Flex-Energy\(^2\) Configuration

Shown Connected to Flare

- Automated Flare Cap\(^1\)
- Clean Combustion Gas And Evaporated Water Vapor Exhaust
- Concentrator Exhaust Stack
- Flare
- Multi-Zone High Efficiency Entrainment Separator
- Waste Transfer System For Flare Connection\(^1\)
- Limit of Hot Gas Zone - Typically 600° to 1500°F
- Extent of Direct Contact Heat Exchange and Evaporation Zone
- Start of Cooled Gas Zone - Typically 160° to 190°F

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LM-HT™ Concentrator in FlexEnergy™ Configuration Shown Connected to Power Plant

ID Fan

160°-190° F

GenEx™4 Waste Heat Transfer System

800°-900° F

Engine Muffler And Exhaust Stack

4 GenEx is a trademark and service mark of Heartland Technology Partners, LLC
Design Features

“Plug and Play” Configuration
Connect Power Drop to MCC

Compact Lightweight Design

Portable Process System
Shown With Roll-Off Truck Compatible Skid

Factory Wired On Single Skid
Design Features

Minimum Process Fluid Holdup
Low Momentum Feature (LM)

High Alloy Parts Fabricated from Flat Stock

High Turbulence Key to Managing Suspended Solids (HT)

Minimal Amounts of High Alloy Required

Multiple Quick Opening Access Doors to Process

Excellent Corrosion and Erosion Resistance

No Moving Internal Parts One Fan and One or Two Pumps

Most All Maintenance Performed At Or Near Grade Level
20K GPD Unit – WMI’s Turnkey Landfill

Utilizes ½ of Exhaust Gas from Centaur 40 Turbine
20K GPD Unit – South Canyon Landfill, Glenwood Springs, CO
Septage Water Evaporation

Utilizes Thermal Energy from Burning C&D and Other Waste Wood